Vol 3 – No 6. February 1990.

FORMAT

FOR SPECTRUM AND SAM USERS

Reading FILE MASTER Files
FORMAT Shows You How.

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FORMAT is published by FORMAT PUBLICATIONS. 34 Gourton Road, Gloucester, GL4 0LE, England. Telephone 0452-412572.

Printed by D.S.LITHO. Gloucester. Telephone 0452-23198.

NEWS ON 4

TASWORD 2 FOR SAM.

The SAM Coupé will soon have it's first word processor. Tasman Software are releasing a version of their classic Tasword 2 program. Although a little dated by todays standards Tasword 2 is still used by more Spectrum users than any other word processor so it's appearance on SAM is sure to please lots of people. The program is available direct from Tasman Software Ltd., Springfield House, Hyde Terrace, Leeds, LS2 9LN. Telephone 0532-438301.

Tasman also plan to launch a version of their more advanced word processing system later in the year.

Z88 TRAINING.

The Z88 is not renowned for it's manuals so it is small wonder that many users fail to get to grips with the machine.

Well, now Rakewell Ltd are starting a series of training sessions the first of which will be held on the 23rd February. The sessions cost between £22 and £80 depending on date and length. Further details from the organizers on 0908-366009.

NEW MUSIC PROGRAM.

Music Writer is a new program for the all 128K Spectrums including the +3. Based around an easy to use WIMP environment the program is designed to use the Spectrums built-in sound chip although an extension for MIDI is planned for later this year.

The program has taken it's author, Garry Rowland, over 18 months to write and will be available in a few weeks time at a price of £19.95. A full review will follow in a future issue of FORMAT.

Details can be obtained by calling 01-592-1874.

YOUR SINCLAIR SOLD.

High-street glossy Your Sinclair has been sold by Dennis Publishing after four years as one of the 'big three' Spectrum titles. Future Publishing (publishers of New Computer Express and other computer titles) have purchased Your Sinclair for an undisclosed sum.

New publisher Greg Ingham believes that the magazine is a tremendous title and that Future have lots of plans for it.

The big three - Sinclair User, Your Sinclair and Crash - have been chasing dwindling markets over the last few years. Could this be the first round in the great shake-up? Only time will tell.

BLACKPOOL EXHIBITION.

This years Radio, Electronics & Computing show will be on Sunday the 18th March at the Norbreck hotel. With over 50,000 sq.ft. of show space this is the largest show of its type in the north.

SECURITY MAD.

You have all heard of Red Nose Day, Bob A Job Week, Plant A Tree Year, or their like. Well now there's an new one - The International Week of Computer and Communications Security. What a mouth full, is it a joke? No the world-wide event, starting Monday the 12th March, is being organized to coincide with the Securicom '90 congress on computer security and Infosec, the first European trade show on the subject. Both events take place in Paris.

URGENT we need your news. Clubs, Shows, New Releases, anything you think other people should know about.

My apology for the late arrival of the January issue. Whenever I stick my neck out and give a publication date something comes along and spoils my plans. The original plan was to have the issue printed before Christmas so it could have been posted out just before New Year. Still, thanks to the speedy efforts of the printers I did manage to get it out by the 11th.

Changing subject completely, I have had several letters and many telephone calls from readers worried that MGT are about to drop the PLUS D. Well let me put your minds at rest, MGT will continue to produce the PLUS D for as long as there is a demand. But until the end of February, when they move into their new 'purpose built' factory and office block in Swansea, they only have room for storing SAM related products. A large batch of PLUS Ds were made in December but high demand has caused a shortage. If you can hold on production will catch up in March.

Someone opening their FORMAT this month has already had a nice surprise. Next month I will tell you who won our POT of GOLD in our Autumn Subscription Drive. The figures are in, the lucky winner drawn and the check sent out. Find out who the lucky person is in next months issue.

The ALL FORMATS COMPUTER SHOW to be held at the New Horticultural Hall, Elverton Street, Westminster, London SW1, on Saturday the 10th February, should be a must for FORMAT readers. Not since the death of the ZX Microfairs has so much of interest to us been gathered under one roof. As mentioned last month, MGT will have a very large stand dedicated to the SAM Coupé and for many people this will be the first opportunity to see the new machine. The show starts at 10am but I would advise you to get there early because long queues are expected. FORMAT will be there (stand 40) so come along and have a chat if you can fight your way through the crowds.

And now a situation vacant notice. Wanted - One reporter. To take responsibility for producing one or two pages of news items for FORMAT each month. Skills needed include the ability to write. Hours from 1 to 100 per month depending on how slow you fill the pages. Salary by negotiation but very low. Anyone like the sound of this job? Apply by phone to the Editor.

Long standing readers will know that every few months I have a moan, OK - I moan about something most months, so why should this month be any different. This month I want to remind people that renewals and orders don't get processed unless they have your subscription / membership number on them, they just end up in my hold-back file until I get enough free time to look through the database for a match of name or address. This can take some time, so PLEASE remember your number.

There are still lots of small companies producing Spectrum programs (that are not arcade games). Most are forced to rely on word of mouth to spread news of their products as they can't afford the high price of advertising in the glossy mags. If any readers know such companies then drop me a line with their address and telephone number and I will try an give them some publicity.

Bob Brenchley, Editor.

SHORT • SPOT

By:- John Wase.

I'm back already with some information from Mike Goodman. He has some novel ways of calling machine code from Basic which certainly work on the Spectrum, and, from initial tests, on the SAM as well.

Method 1 assumes a Spectrum in which the Basic area is at 23755 and CHANS starts at 23754. POKE 23739/40 with the code start address and provided that you avoid CLS or LIST (either of which causes a ROM reset of these addresses to their normal values), a PRINT command will cause a jump to the machine code routine.

With Method 2, there are no problems with ROM resets: with this vector either LPRINT or LLIST causes a jump to the code provided you have POKEd 23749/50 with the low byte/high byte of the code start.

Method 3 involves the "R" channel which is normally used for editing. POKE 23744/5 with the address of the code, and provided you have at least one line of Basic present in memory, pressing the "edit" key will jump to your address: to emulate the "edit" key in software, simply use the command "RANDOMIZE USR 4009 (decimal).

Method 4 uses channel K at addresses 23736/7. POKEing these two locations with the code start and following with SAVE "name" does the trick.

Malcolm says that for a novel demo, try POKE 23736,112: POKE 23737,9: SAVE "name". I dare you.

Method 5 is specially for 48Kers. Entering the command RANDOMIZE USR 3884 normally produces the error message "Report J - Invalid I/O device", but if you first POKE 23741/2 with your code start address, then off it runs - on 48K Spectrums: 128K users encounter inconsistent results.

Malcolm mentions that the code is entered with HL holding the start address as opposed to BC as one normally expects, also that microdrive users should add 58 to any CHANS addresses given in order for this vectoring to work. Finally, he mentions that it is possible to manipulate the streams area at 23568 instead of the channels, still producing a vector address.

Michael has promised to send more short routines of this type and we'll try and fit them into a future issue.

I've also got a note from John Bloxley of Stockton on Tees, who sent several short programs. Amongst them is a tape header reader. The principle and practice of these is as old as the hills: indeed John mentions that he got the "bones" of this years ago from somewhere, and has embroidered it so that it is now user-friendly. Here is his version.

```
9980 CLEAR 63999: FOR A=64000 TO 64013
     : READ B: POKE A,B: NEXT A: PRINT
      #0;"LOAD TAPE AND PRESS PLAY "
9981 DATA 55,62,0,221,33,20,250,17,17,
     0,205,86,5,201
9982 RANDOMIZE USR 64000
9983 LET A=64020: LET B=PEEK AZ LET S=
     B
9984 IF B=0 THEN PRINT "PROGRAM:-",
9985 IF B=1 THEN PRINT "NUMERIC ARRAY:
     -",
9986 IF B=2 THEN PRINT CHARACTER ARRAY
     :-",
9987 IF B=3 THEN PRINT "BYTES:-",
9988 FOR A=64021 TO 64030: LET B=PEEK
     A: PRINT CHR$ B;: NEXT A: PRINT
9989 LET B=PEEK A+256*PEEK (A+1): PRIN
     T "DATA LENGTH:- ",B
9990 LET A=A+2: LET B=PEEK A+256*PEEK
     (A+1): IF S=3 THEN PRINT "START A
     DDRESS:- ",B
9991 IF S<>0 THE GOTO 9995
9992 IF B<1 OR B>9999 THEN GOTO 9994
9993 PRINT "AUTO START AT:- ",B
9994 LET A=A+2: LET B=PEEK A+256*PEEK
     (A+1): PRINT "PROG/VARS LENGTH ";
     B
9995 PRINT : PAUSE 2: POKE 23692,255:
     GOTO 9982
9996 SAVE D1"TAPE READ" LINE 9980
```

As this was not sent in on a disc, I haven't had an opportunity to check it. If it were my version, I think I would like to have an extra bit in line 9995, printing "LOAD NEXT TAPE", before returning to 9982, but there, that's personal preference.

Talking of discs, I have had one or two personal problems of late which have delayed my sending out revised discs of Daniel Nicdle's program, although I have had a pile of duplicated discs ready for some days now: my apologies and rest assured, I will send them out shortly.

Derek Porter of Norton, Stourbridge, has recently reviewed a book called "Mathographics" by R. Dixon, published by Blackwells. He mentioned that he enclosed a review, but it failed to reach me so I have only the barest details. It is a book on the drawing of geometrical figures, with, in the second half, instructions for computer drawing of patterns, including spirals, daisies, transformations of patterns and fractal patterns, and includes many intriguing illustrations of what can be done, particularly with transformations. Unfortunately he doesn't give the price or the date, but it must be pretty recent, and from the general tone of the comments is affordable. It looks very good, for it shows you how to produce a variety of pictures. The book is not for one specific computer so it's not full of listings but is does guide you through writting routines. This is an example, written by Derek as one of the exercises in the book.

```
299 REM ***STARS**************
300 REM ***AN EXERCISE FROM***
310 REM ***MATHOGRAPHICS******
320 REM ***BY R. DIXON********
330 DIM X(500): DIM Y(500)
335 INPUT "K=";K: INPUT "C=";C
340 PRINT K;"/";C
345 LET D=2*PI/C: LET A=1
350 FOR S=1 TO 180
355 LET T=A^(.2)
360 LET R=K^T
365 LET P=1
370 FOR L=0 TO 5
375 LET B=L*2*PI*2/5
380 LET E=1.02^S
385 LET X(P)=E*COS B+R*COS A+127
390 LET Y(P)=E*SIN B+R*SIN A+87
395 IF P=1 THEN PLOT X(1),Y(1)
400 IF P>1 THEN DRAW X(P)-X(P-1),Y(P)-
    Y(P-1)
405 LET P=P+1
410 NEXT L
415 LET A=A+D
420 NEXT S: STOP
```

```
4/1.414  Line 380 e=1.04ts
```

This produces a catherine wheel of stars ejected from a central point, the program carries on until it can't draw any more. Subtle alterations in line 380 produce variants of this basic pattern.

That's all for this moment - please keep the bits and pieces coming in, or I'll have nothing to print! Please remember to include a S.A.E. if you want your tape/disc returned.

Send your contributions to:-

John Wase,
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
WR10 2LX.

PALETTE

PART 1 OF A LOOK AT SAM BASIC

By:- Ken Elston.

In mode 4 on the SAM Coupe (this is the mode it starts up in) every pixel on the screen can be one of 16 colours. The PALETTE command selects which of the 128 colours will be displayed for each of the 16 entries in the CLUT (Colour Look Up Table). Each slot in the CLUT can hold a colour number in the range 0 to 127, so PALETTE 5,96 makes the 5th CLUT entry 96 which is a yellow(ish) colour called Damp Straw by the designers. Those designers must have been on something when they chose the names for some colours, how about: 28 - Dolphin, 45 - Doggy Tongue, 49 - Misery Blue, 86 - Sea Spume, 97 - Slug Belly, 110 - Cold Custard, too name but a few of the oddest.

Right so we have all these colours. Now what can you do with them on screen. Type in the following and we'll try a few tricks:-

```
10 REM Circles.
20 PRINT "START."
30 FOR I=10 TO 80
40 CIRCLE PEN RND(15);120,85,I
50 NEXT I
```

On SAM the command PEN does the same job as INK on the Spectrum, it's even intelligent enough that if you type in INK the editor changes it to PEN for you. RND(15) gives a random number in the range 0 to 15 so when you now run the program you will get circles in random colours. But now for the real power of the PALETTE command. Add the following lines to the program.

```
60 INPUT "press Return to go.";T$
70 FOR I=1 TO 1000
80 PALETTE RND(15),RND(127)
90 PAUSE 5: NEXT I
100 PALETTE
```

Now run the program, after drawing the circles, as before, it waits for you to press Return and then starts to change palette entries at random.

You will find that all circles drawn in one original colour will change at the same time, this is because the entry in the CLUT has changed and the colour circuits output the new colour until it is changed again. The last line (110) has PALETTE on its own, this will reset the CLUT to its default values, without this you could be left with PEN and PAPER colours producing the same real colour.

Your programs could produce some fast action by using palette changes to create the illusion of movement on the screen. It's also possible to print text to a screen with the same real colour as the background then, by using a palette change, make the whole block appear at once.

In the SAM Coupé User's Guide there is a program that shows you SAM's colour set, eight at a time (see page 65). Well here is a routine that shows you all 128 colours on screen at the same time. The [CNTR 8] in lines 20 and 40 means press Control and 8.

```
10 PALETTE
20 PRINT '"   ";:FOR N=0 TO 7: PRINT
   PEN N;" [CNTR 8]";: NEXT N
30 FOR X=1 TO 15
40 PRINT '"   ";:FOR N  = 0 TO 7: PR
   INT PEN N+8;" [CNTR 8]";: NEXT N
50 NEXT X
60 FOR X=13 TO 0 STEP -1
70 FOR Y=0 TO 7
80 PALETTE 8+Y,Y+16+(13-X)*8 LINE 30
   +X*9
90 NEXT Y: NEXT X
```

Of course PALETTE works in the other modes on SAM but in each you have a more limited range of CLUT entries to alter. Mode 3 has only four (0-3) but all 128 colours are still available.

YOUR LETTERS

*STAR*LETTER* *STAR*LETTER*

Dear Editor,

In his excellent article 'SPECCYROM ON SAM' (last months issue) Ken Elston wanted to hear from readers who couldn't run some games. Well, I have now finished testing my entire collection of 450 games. Only 2 games refused to co-operate; F-15 Strike Eagle and F-19 Stealth Fighter, both from Microprose. The first crashes half-way through loading (probable with printing on the border), and F-19 crashed after identifying the aircraft and loading in the mission.

I would like to point out however that there are draw-backs to using the SPECCYROM. None of the extra keys on SAM, those that are not on the rubber-key Spectrum are scanned by the 48K's ROM. So you must remember that Caps-shift + 5,6,7 or 8 are the cursor keys. Caps-shift + zero is the delete key and the Space bar can now act as the Break key.

He mentioned in his article that it should be possible to get other Z80 ROMs working on SAM. Does this mean that with a little work you could get SAM compatible with other computers such as the CPC or C64? I hope so, the software base would be gigantic and SAM would be THE computer for the 1990's

Yours Sincerely, William Easson.

Ken thought your letter deserved a wider audience William, and so did I. It's nice when articles prompt such a quick response. Your comments on the keyboard are true, it pays to have your 48k Spectrum to hand to remind you of which key does what.

Personally I don't think SAM needs to run other computers software to be the machine of the 90's. Just as the Spectrum was the machine of the 80's because it was such a delight to use, SAM will win in the 1990's because of it's power, user friendliness, and value for money.

By the way, the C64 is 6502 based not Z80 so there is no way you could get C64 programs to work. But CPC, that's another story, someone will do it in the end I'm sure. Ed.

Dear Editor,

I have been a Spectrum owner since 1984. In 1988 I added a PLUS D and disc drive and at the same time came into contact with FORMAT for the first time. It was just what I wanted, articles on REAL computing (not pathetic games reviews) targeted at MY machine, I was hooked.

That was until the January 1990 issue, eleven pages devoted to a review of the SAM Coupé. I'm a Spectrum owner, FORMAT was a Spectrum mag. I don't intend to buy a new computer, the Spectrum does everything I want it to. Be true to your readers and stick to the Spectrum.

Yours Sincerely, Stephen Morrison.

Slow down Stephen, I think you missed my editorial last month. The large review of SAM was a special, it was the FIRST review of the Coupe published anywhere in the world (quite a feather in our cap) and from the response I have had from readers it was in general well received.

I also pointed out that we are not going to neglect the Spectrum. Remember that the Coupe and the Spectrum have much in common, many articles in FORMAT will appeal equally to users of both machines. Don't worry, the Spectrum wont be neglected, you can rely on FORMAT Ed.

Dear Editor,

Without doubt FORMAT is the best magazine going. I have the full set and have read them cover to cover, but still you come up with new articles that bring up new ideas for my computer. Oh if only FORMAT was

weekly, I wouldn't have to wait for so long between issues.

Yours Sincerely, Dave Roland.

My personal letter of thanks for this accolade is on its way to Dave, written on the back of a £50 note. No readers, I didn't write this myself - HONEST - I didn't. Ed.

Dear Editor,

A long time ago you published some articles on Micronet. I have now got a modem but I don't want to use it for Micronet as that is so expensive. Is there any information on other uses for modems you can print?

Yours Sincerely, Barry Jones.

Nothing coming up in the near future I'm afraid, nobody has sent in any articles on communications and modems. But purhaps your letter will stir this up. Ed.

Dear Editor,

What happened to the usual Christmas Wordsquare this time. I searched for it in Decembers issue but it was nowhere to be found. You came close to ruining my Christmas.

Yours Sincerely, K.R.Wilton.

Same old excuse I'm afraid, lack of space. There have been several letters on this subject, it seems wordsquares are popular amongst our intellectual readership. If someone would like to take on the job of compiling the wordsquares I could make it a more regular feature, what do other readers think? Ed.

Dear Editor,

Could any reader please tell me where you can get add-on keyboards for a 128k Spectrum. I need a better keyboard but can't find one anywhere.

Yours Sincerely, Collin Rich.

Letters printed may be edited for length or clarity. The writer of each months STAR LETTER wins an EXTRA 3 months subscription to FORMAT.

SMALL ADS

WANTED Saga 2001 infra-red remote transmission keyboard, Spectrum version. Ring Mark Young on 0454-324485 or 0454-314315, reasonable times please.

RAM MUSIC MACHINE with instruction book, sample software, demo, headphone, in very good condition. Not for +2A or +3. £30. Phone Daniel Cannon on (0636) 77398 after 6pm.

LEEDS AREA. Anyone living in or around Leeds wanting to meet fellow Spectrum user, or wanting to learn machine code. Please ring Leeds 683618. Ask for Malcolm.

INFORMATION PLEASE on Spectrum keyboard marked "Fuller Micro Systems. The FDS Keyboard". Copying and postage reimbursed. Lunson. 17, Tongdean Rise, Brighton. BN1 5JG.

YOUR ADVERT

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DFLIP

By: Nev Young.

The DISCIPLE and PLUS D both allow you to save 80 files onto a disc, but with 780k of space on a double-sided / 80 track disc this can lead to a lot of wasted space if most of your files are quite small e.g. text files from your wordprocessor. Ever wished for more files on a disc? Read on, DFLIP could answer your prayers.

As most of you will know the first four tracks (0-3) contain the directory entries, with two per sector that gives you the 80 files maximum. It would be nice to add extra sectors but, as the routines are in the ROM part of the DOS this isn't possible, or is it? The extra sectors don't have to come straight after the normal area. The ideal place for a second directory would be on side two of a disc, with half the total space allocated to each.

First type in the two blocks of source code and assemble them, it doesn't matter what ORG address you use but load the first one to address 65000 and the second to 65023 and then save as one block by SAVE d*"DFLIP_C" CODE 65000,400. If you haven't got an assembler then you will have to use the code poker (listing 4) but go out and buy an assembler right away - poking is not the way to handle machine code.

Now type in listing 1. This is the program that formats your discs and creates the dual directory.

Track's 128 to 131 (that's 0-3 on side two) are used to hold a new set of directory entries. DFLIP is saved as an Execute file on both sides of the disc, the directory bit maps are altered to protect the space that is used by the other directory. If, after formatting you type CAT 1 you will see an Execute file called "**dflip1**".

Now type LOAD P1 and press enter. After a short period of disc action you will get the OK message, type CAT 1 again and you now see a file called "**dflip2**". Each directory has 379k free on an 80 track disc. To get back to the first directory just type LOAD P1 again.

The routine loads as an EXECUTE file and then finds room in the Spectrums work-space area. The routine works on either drive. If there is not enough free space for the routine (it needs about 1k) then you will get error message 4 Out of memory.

LISTING 1. DFLIP - Format Basic.

```
 10 CLEAR 39999
 20 LOAD d*"DFLIP_C"CODE 65000
 30 LET TRK =USR 65000
 40 IF TRK < 128 THEN PRINT "DFLIP on
    ly works on double sideddiscs": S
    TOP
 50 IF NOT TRK = 208 AND NOT trk = 16
    8 THEN PRINT "DFLIP only works on
     40 and 80  track drives": STOP
 60 CLS : PRINT "Load disc for twin d
    irectory  formating in drive
   #1 and press enter"
 70 PAUSE 0
 80 PRINT '''"Formatting disc #1"
 90 FORMAT d1
100 SAVE d1"**DFLIP1**"x,65023
110 LOAD P1
120 SAVE d1"**DFLIP2**"x,65023
130 LOAD @1,0,1,50000
140 LET X = 401: IF TRK = 208 THEN LE
    T X = 801
150 LET HI =INT (X/256)
160 LET LO=X-256*HI
170 LET C= 50+50*(TRK=208)
180 POKE 50011,HI: POKE 50012,LO
190 FOR N=50015 TO 50014+C: POKE N,25
    5: NEXT N
200 LOAD @1,0,1,16384: CLS : SAVE @1,
    0,1,50000
210 LOAD P1
220 LOAD @1,0,1,50000
```

```
230 POKE 50011,HI: POKE 50012,LO
240 FOR N=50010+C TO 50009+C+C: POKE
    N,255: NEXT N
250 LOAD @1,0,1,16384: CLS : SAVE @1,
    0,1,50000
260 CAT 1
```

LISTING 2. SOURCE CODE PART 1.

```
0010 ;DFLIP SOURCE - SECTION 1.
0020
0030 ;Page in
0040          RST 8
0050          DEFB 71
0060          LD B,0
0070
0080 ; Test system type
0090          LD A,L
0100          OR A
0110          JR Z,PLUS
0120
0130 ; We have a DISCiPLE
0140          LD A,(665)
0150          LD C,A
0160          OUT (187),A
0170          RET
0180
0190 ; We have a PLUS D
0200 PLUS     LD A,(8193)
0210          LD C,A
0220          OUT (231),A
0230          RET
```

LISTING 3. SOURCE CODE PART 2.

```
0010 ;DFLIP SOURCE - SECTION 2.
0020
0030 ;
0040 CMR      EQU 16
0050 WKSP     EQU 23649
0060 DRIVE    EQU 23681
0070 HK44D    EQU 5506 ;DISCiPLE
0080 HK45D    EQU 5536 ;DISCiPLE
0090 DDRIVE   EQU 6862 ;DISCiPLE
0100 HK44P    EQU 12244 ;PLUS D
0110 HK45P    EQU 12274 ;PLUS D
0120 PDRIVE   EQU 15054 ;PLUS D
0130
0140 ;Begin
0150 ;Make space
0160          LD BC,21*512
0170          RST CMR
0180          DEFW 48
0190
0200 ; Test for +D or DISCiPLE
0210          LD A,(8192)
0220          CP 243
0230          JR NZ,PLUS
0240
0250 ; We have a DISCiPLE
0260          LD A,(DDRIVE)
0270          OR A
0280          JR NZ,DO
0290          LD A,2
0300 DO       LD (DRIVE),A
0310
0320 ; Start of code mover
0330          LD HL,D1+7126
0340          LD BC,D_END-D1
0350          LD DE,(WKSP)
0360          PUSH DE
0370          LDIR
0380          JP (HL)
0390
0400 ; We have a PLUS D
0410 PLUS     LD A,(PDRIVE)
0420          OR A
0430          JR NZ,PO
0440          LD A,2
0450 PO       LD (DRIVE),A
0460
0470 ; Start of code mover
0480          LD HL,P1+15318
0490          LD BC,P_END-P1
0500          LD DE,(WKSP)
0510          PUSH DE
0520          LDIR
0530          RET
0540
0550 ; Start of relocated code
0560 D1       DEFB 0
0570          LD B,4
0580          LD D,0
0590 ; Move track
0600 D2       LD HL,(WKSP)
0610          INC H
0620          INC H
0630          PUSH HL
0640          POP IX
0650          PUSH BC
0660
0670          LD B,5
0680          LD E,1
0690
0700 D3       LD A,(DRIVE)
0710          CALL HK44D
0720          INC E
0730          INC E
0740          DJNZ D3
0750
0760          LD B,5
0770          LD E,2
0780
0790 D3A      LD A,(DRIVE)
0800          CALL HK44D
0810          INC E
0820          INC E
0830          DJNZ D3A
0840
0850          SET 7,D
0860          LD B,5
0870          LD E,1
0880
0890 D4       LD A,(DRIVE)
0900          CALL HK44D
0910          INC E
0920          INC E
0930          DJNZ D4
0940
0950          LD B,5
0960          LD E,2
0970
0980 D4A      LD A,(DRIVE)
0990          CALL HK44D
1000          INC E
1010          INC E
1020          DJNZ D4A
1030          JR DSKIP
1040
1050 JTOD2    JR D2
1060
1070 DSKIP    LD HL,(WKSP)
1080          INC H
1090          INC H
1100          PUSH HL
1110          POP IX
1120
1130          LD B,5
1140          LD E,1
1150
1160 D5       LD A,(DRIVE)
1170          CALL HK45D
1180          INC E
1190          INC E
1200          DJNZ D5
1210
1220          LD B,5
1230          LD E,2
1240
1250 D5A      LD A,(DRIVE)
1260          CALL HK45D
1270          INC E
1280          INC E
1290          DJNZ D5A
1300
1310          RES 7,D
1320          LD B,5
1330          LD E,1
1340
1350 D6       LD A,(DRIVE)
1360          CALL HK45D
1370          INC E
1380          INC E
1390          DJNZ D6
1400
1410          LD B,5
1420          LD E,2
1430
1440 D6A      LD A,(DRIVE)
1450          CALL HK45D
1460          INC E
1470          INC E
1480          DJNZ D6A
1490
1500          POP BC
1510          INC D; Next track
1520          DJNZ JTOD2
1530          RET
1540
1550 DEND
1560
1570
1580 ; START OF RELOCATED CODE
1590 P1       DEFB 0
1600          LD B,4
1610          LD D,0
1620 ; Move track
1630 P2       LD HL,(WKSP)
1640          INC H
1650          INC H
1660          PUSH HL
1670          POP IX
1680          PUSH BC
1690
1700          LD B,5
1710          LD E,1
1720
1730 P3       LD A,(DRIVE)
1740          CALL HK44P
1750          INC E
1760          INC E
1770          DJNZ P3
1780
1790          LD B,5
1800          LD E,2
1810
1820 P3A      LD A,(DRIVE)
1830          CALL HK44P
1840          INC E
1850          INC E
1860          DJNZ P3A
1870
1880          SET 7,D
1890          LD B,5
1900          LD E,1
1910
1920 P4       LD A,(DRIVE)
1930          CALL HK44P
1940          INC E
1950          INC E
1960          DJNZ P4
1970
```

```
1980            LD B,5
1990            LD E,2
2000
2010 P4A        LD A,(DRIVE)
2020            CALL HK44P
2030            INC E
2040            INC E
2050            DJNZ P4A
2060            JR PSKIP
2070
2080 JTOP2      JR P2
2090
2100 PSKIP      LD HL,(WKSP)
2110            INC H
2120            INC H
2130            PUSH HL
2140            POP IX
2150
2160            LD B,5
2170            LD E,1
2180
2190 P5         LD A,(DRIVE)
2200            CALL HK45P
2210            INC E
2220            INC E
2230            DJNZ P5
2240
2250            LD B,5
2260            LD E,2
2270
2280 P5A        LD A,(DRIVE)
2290            CALL HK45P
2300            INC E
2310            INC E
2320            DJNZ P5A
2330
2340            RES 7,D
2350            LD B,5
2360            LD E,1
2370
2380 P6         LD A,(DRIVE)
2390            CALL HK45P
2400            INC E
2410            INC E
2420            DJNZ P6
2430
2440            LD B,5
2450            LD E,2
2460
2470 P6A        LD A,(DRIVE)
2480            CALL HK45P
2490            INC E
2500            INC E
2510            DJNZ P6A
2520
2530            POP BC
2540            INC D: Next track
2550            DJNZ JTOP2
2560            RET
2570
2580 PEND
```

LISTING 4. The Data Poker.

```
 10 CLEAR 64999
 20 LET CHK=0
 30 FOR I=65000 TO 65500
 40 READ N: IF N=-1 THEN GOTO 70
 50 POKE I,N: LET CHK=CHK+N
 60 NEXT I
 70 IF CHK<>33152 THEN PRINT "Error i
    n data": STOP
 80 SAVE d*"DFLIP_C" CODE 65000,400
 90 DATA 207,71,6,0,125,183,40,7,58
100 DATA 153,2,79,211,187,201,58,1,32
110 DATA 1,32,79,211,231,201,0,1,0,42
120 DATA 215,48,0,58,0,32,254,243,32
130 DATA 25,58,206,26,183,32,2,62,2
140 DATA 50,129,92,33,21,28,1,147,0
150 DATA 237,91,97,92,213,237,176,233
160 DATA 58,206,58,183,32,2,62,2,50
170 DATA 129,92,33,168,60,1,147,0,237
180 DATA 91,97,92,213,237,176,201,0,6
190 DATA 4,22,0,42,97,92,36,36,229
200 DATA 221,225,197,6,5,30,1,58,129
210 DATA 92,205,130,21,28,28,16,246,6
220 DATA 5,30,2,58,129,92,205,130,21
230 DATA 28,28,16,246,203,250,6,5,30
240 DATA 1,58,129,92,205,130,21,28,28
250 DATA 16,246,6,5,30,2,58,129,92
260 DATA 205,130,21,28,28,16,246,24,2
270 DATA 24,185,42,97,92,36,36,229
280 DATA 221,225,6,5,30,1,58,129,92
290 DATA 205,160,21,28,28,16,246,6,5
300 DATA 30,2,58,129,92,205,160,21,28
310 DATA 28,16,246,203,186,6,5,30,1
320 DATA 58,129,92,205,160,21,28,28
330 DATA 16,246,6,5,30,2,58,129,92
340 DATA 205,160,21,28,28,16,246,193
350 DATA 20,16,184,201,0,6,4,22,0,42
360 DATA 97,92,36,36,229,221,225,197
360 DATA 6,5,30,1,58,129,92,205,212
370 DATA 47,28,28,16,246,6,5,30,2,58
380 DATA 129,92,205,212,47,28,28,16
390 DATA 246,203,250,6,5,30,1,58,129
400 DATA 92,205,212,47,28,28,16,246,6
410 DATA 5,30,2,58,129,92,205,212,47
420 DATA 28,28,16,246,24,2,24,185,42
430 DATA 97,92,36,36,229,221,225,6,5
440 DATA 30,1,58,129,92,205,242,47,28
450 DATA 28,16,246,6,5,30,2,58,129,92
460 DATA 205,242,47,28,28,16,246,203
470 DATA 186,6,5,30,1,58,129,92,205
480 DATA 242,47,28,28,16,246,6,5,30,2
490 DATA 58,129,92,205,242,47,28,28,
500 DATA 16,246,193,20,16,184,201,-1
```


SOUND BOARD
FOR THE 48K SPECTRUM

By Bob Green.

As an Australian Spectrum and PLUS D user and also a FORMAT subscriber, I thought perhaps it was time I contributed to the magazine in some way. When Dave Kitzen, from the Perth Spectrum user group, told me about a sound interface they had designed for 48K Speccy owners, I saw the ideal way to contribute particularly since I had just become the proud owner of the Kemsoft P.C.B designer package.

Well as received from Perth, the sound board was built up on Veroboard. I re-hashed the design and produced a Printed Circuit board, Overlay, Labels and circuit diagram. I also obtained permission from Dave to send it all in for publication so here goes:

It is well known, that the 48K Speccy is sadly lacking in sound, with its single bit output port. Although many software programmers have achieved wonders with that single bit, it does not begin to approach the effects one can get on a 128K machine.

OK, what Dave Kitzen did was to take a close look at the way the sound chip

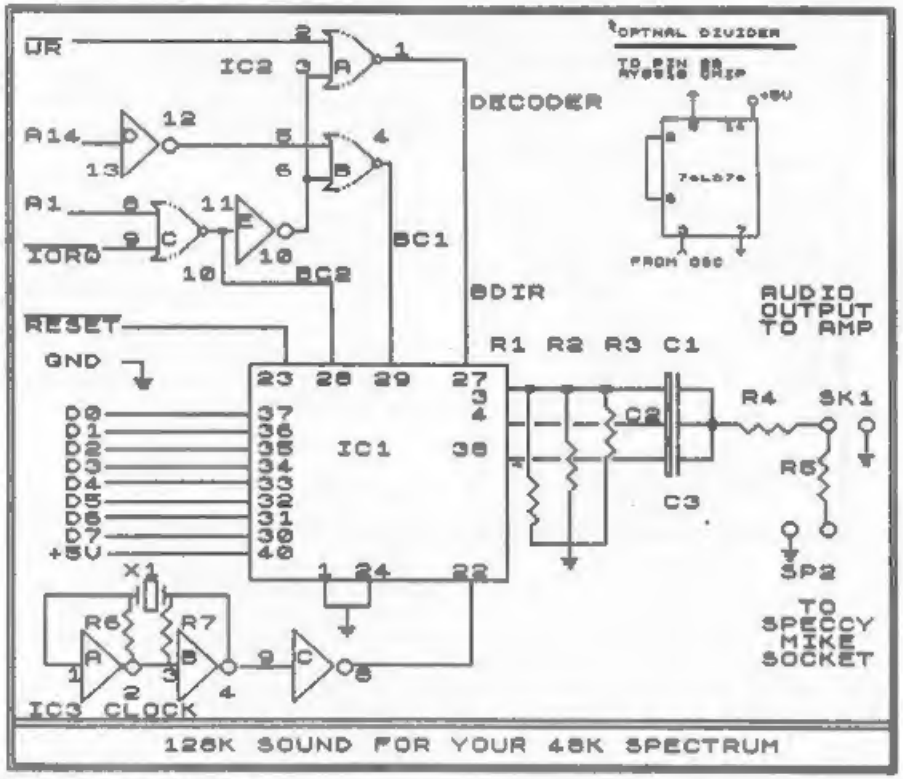


Fig 1. Circuit Diagram.

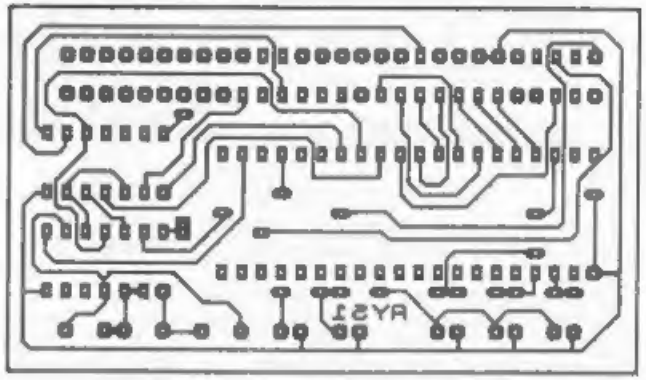


Fig 2.
P.C.B. Layout.
(Actual size)

(AY-3-8910) in the 128K machines was addressed and then produce a design that emulated that circuitry but as a plug in board for 48K machines. Sure companies have produced add on 3 channel synths using the AY-3-8912 or AY-3-8910, but they have not been mapped in at the same address as the 128K so software that uses them has been reather limited.

PARTS LIST	
IC1	AY8910
IC2	74LS02
IC3	74LS04
R1-3	1KR
R6-7	330R
R4	10K
R5	68K
C1-3	12UF
X1	1.8 MHZ XTL
1	MINI PLUG
1	MINI SOCKET

Fig 3. The Parts List.

With this board plugged into your Speccy, you can listen to those nifty 128K sound effects within existing games software.

This is done by saving a 128K program into 48K mode on a 128K machine, so you would need to purchase a 128K version of a game and get a friend with a 128K Speccy to save it back to 48K mode for you. Not all games will work this way, but a lot do and I have produced a list of those I have found to work. I currently have both a 128K and 48K machine so it was easy for me to experiment.

Of further interest, is the fact that the latest COMPOSER program from Torchraven, called MUSIC MAESTRO, runs perfectly well as is. You can compose, load, play and save 3 channel sound music scores just as if you had a 128K machine. Which brings me to another subject. I would like to thank Torchraven for sending me a free copy of their program to test on this system. I would also like to recommend any of you that are even slightly into composing or just like good sound, to buy MUSIC MAESTRO.

THE DESIGN

Ok now for the nitty gritty. How does it work? Well, Dave has taken an AY-3-8910 sound chip, done some decoding using a couple of TTL chips and provided a clock to drive the sound chip. The secret of course, was in working out where to map the board in so that it looked the same as the sound chip in 128K machines. The only other connections needed to the chip are the Reset line, a +5 volt power supply and Ground. You can see from the circuit diagram how simple the design is.

BUILDING IT

Naturally you must have had some experience in building Electronics circuits up, but if not try and find a friend who has. It really is a piece of cake and since the PC board design is included here, I will go through the necessary steps.

The PCB is shown in fig 2. It is reversed as per Kemsoft PCB Designer's standard. Get a good (dense black) photocopy and work from that. The component layout is given in fig @ which should be easy to follow.

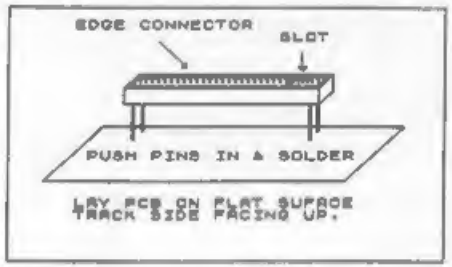


Fig 4.

Firstly mount the edge connector. Turn the PCB face down with the track side up and the two rows of 28 holes to the back of the board.

Take your edge connector with the wire-wrap pins facing down with the slot to the right hand end (see fig 4) and insert all pins in the holes so that they just protrude through the other side of the board. This will take some doing, but take my word for it, it can be done. I Started one end and by using a dentist probe, one by one, gently nudged them into the pcb holes at the same time keeping pressure on the edge connector.

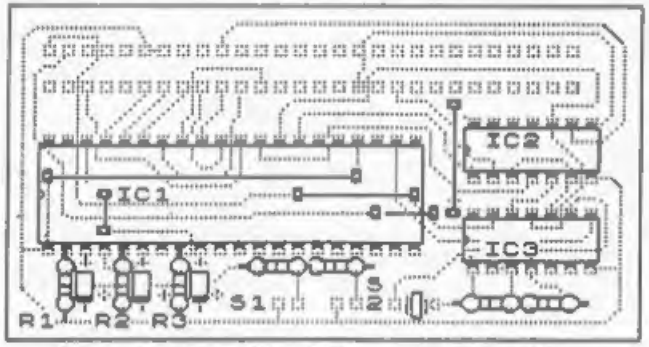
Once you have them all in, make sure the connector is positioned on the correct vertical and horizontal plane and solder the two end diagonal pins. Now solder all the remaining pins to the pcb tracks.

NOW THE EASY BITS

Fig 5 gives the component layout for the board (viewed from the component side). It should be easy to follow the next steps.

1. Install links shown.
2. Install a 40 pin socket in IC1 position.
3. Install 2 x 14 pin sockets in IC2 and IC3 positions.
4. Fit all resistors in positions shown (refer parts list).
5. Fit all capacitors shown (again refer layout).
6. Fit the crystal - X1 (1.8 or 3.5 Mhz) - see notes below.

And finally fit a jumper wire through



COMPONENT LAYOUT FOR AYSOUND1

the connector pins so that the Reset pin on the AY8910 (pin 23), is joined to the reset line on the edge connector (B20). Sorry but I couldn't fit a link on the board for this one due to the small board design.

CLOCK CRYSTAL

As shown, a 1.8 Mhz xtal, will run the sound synth at correct musical pitch. If you cannot obtain this crystal then the alternative is to use a 3.59Mhz xtal which may be easier to obtain in some countries. If you need true pitch, use the optional divider circuit shown in Fig 5. You will have to fit it inside the synth case and hard wire though, as space is tight.

HOOKING IT UP

Cut two short lengths, (about 5") of shielded wire. Fit the end of one length to the SP2 position on the PC board. To the other end of this, fit a mini jack-plug (to fit the Spectrum Mike socket). Take the other length of shielded wire and solder one end to the SK1 position. Fit a mini socket on the other end of this wire.

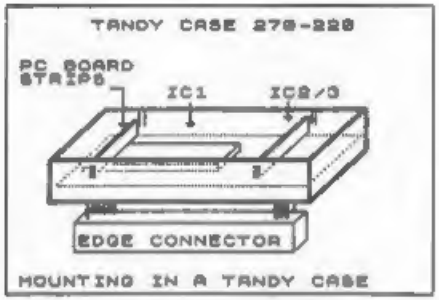


Fig 6.

Now assemble the board into the case (see fig 6) Cut a hole in the bottom of the case to allow the edge connector to pass through. Drop pcb assemly into the case and then use two off-cuts of pcb to hold the board in place (using the slots provided in the case. Then fit the top and screw into place.

If you have done everything right, you should now be able to plug the interface into your Spectrum's edge connector (POWER OFF PLEASE), plug the mini plug from the sound board into the Spectrum mike socket and your cassette lead into the sound board mini socket (see fig 7). The output from this socket contains both the Spectrum BEEP, and the 3 CHANNEL sound board output. You could run this line to an external audio amplifier or use your cassette player in record mode (with monitor on) to listen to beautiful music!

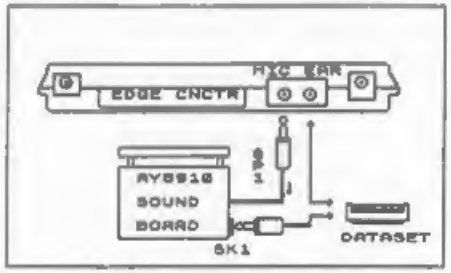


Fig 7.

Once tested all you need to do is label the interface. I've provided two versions of the label artwork (fig 8) for you to photocopy and cut out, one for the edge-connector side - to use if you plug the interface in normaly, and one to go on the other side to use if you mount the device in the top slot of a Two-Face.

SOME GAMES THAT PLAY 3 CHANNEL SOUND ON A 48K SPECTRUM

HOTSHOT - ELEVATOR ACTION - EXELON
BALL BREAKER - ENDURO RACER
BRAINSTORM - STORMLORD - REX
TARZAN - MOTOS - BRAT ATTACK
MANTRONIX - RED DOOR - BOULDERDASH 3

Well that's about it, except to mention that if any user wants to purchase a P.C.B from myself, I can supply for a special price of $10.00 Australian including P&P to the U.K. Alternatively, since I have provided all artwork, I am sure most enterprising electronic buffs with a

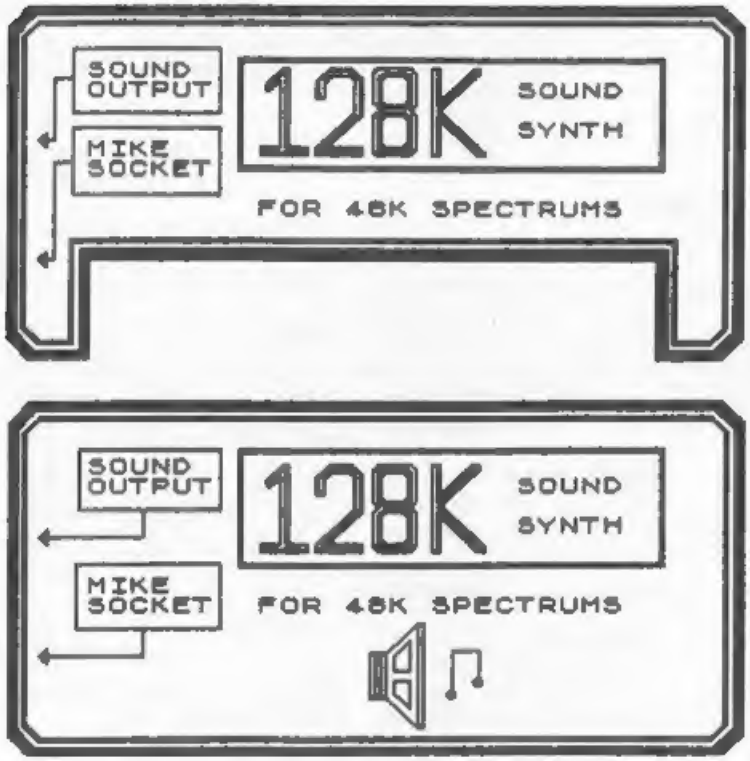


Fig 8. Label Artwork.

Speccy can get P.C boards made in the U.K.

If not, drop me a line at the following address:-

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BETT 90 SHOW REPORT

By:- John Wase.

Thursday 18th January: grinding down to Evesham station for the 8.09 Paddington express. Traffic was heavy. Would John Croghan (of SUSIE fame) make it in time, all the way from Stourbridge? There he was, in the queue, in front of me! And there we were, on the train to London, to the Barbican, to the British Education and Training Technology Exhibition, BETT 90.

I'd never been before and didn't know what to expect. My first impression was one of total bewilderment - four huge, slightly claustrophobic exhibition halls, filled to the brim with technology. There were loads of plotters, plotting maps, charts, and on one stall, ill-spelled diagrams of a nuclear attack (I thought this was an education exhibition). There were robots, arms, automatic machines, meccano, lego and look-alikes, all whirring, oscillating or rotating.

There were firms offering sets of printed acetates for overhead projectors, firms offering plotters to plot them and more firms offering pens to draw them. There were plain printers, dotty printers and screen dumps from those lovely Integrex colour ink-jet printers (oh for a driver). There were things that had been designed by schools and the wherewithal to design them, print them, output them, make them and, if necessary, destroy them. There was lots of software. Software to train, to bore, to excite. Software to organises pupils, libraries, registers, schools, colleges and universities. And books to read all about it (how about the Encyclopaedia Brittanica top-of-the-range leather-bound set? FANtastic).

And there were computers. Commodore had a big stand. So did the Apple Macs. There were Acorns everywhere, from the BBC Masters to the inevitable Archies on lots of stalls. Their own stand featured high level speakers, blaring out words above the packed area beneath: unfortunately they were totally inaudible, and also ensured that the compliant devotees below, asking questions of the stall's acolytes, would go completely deaf in maturity.

But above all, there were these RMI machines. They seem to have a stranglehold on Education, but are almost totally unknown in the outside world. They were ubiquitous at the exhibition; their staff were, I must admit, competent, helpful and well equipped, pushy salespeople. I resisted the insane urge to buy and pushed on to MGT, second hall upstairs.

There they were, SAM at the ready, both the cartoon and the computer, showing various clips of educational software, amidst Roger Rabbit, Flash and the inscrutable Sphinx in glorious technicolour. This was all presided over by Penny, Sally and others, with Alan Miles, urbane, but, I suspect, a little weary, sorting out the contacts. I must admit, the stall looked good, and clearly a number of top-level enquiries were coming in. Good stuff, folks, keep it up.

Above all, however, the exhibition was pervaded by new Government Legislation: like the National Curriculum (Cwricwlwm Cenedlaethol to the folks in Swansea). This was the subject, in one form or another, of most of the seminars held there. These produced a somewhat ambivalent set of answers to evident problems. On the one hand, Roger Keeling gave a stimulating, and I thought, pretty

realistic discussion of "IT and the Primary School" up to the last 5 minutes, when he suddenly announced that really every pupil should have a 2-megabyte, 20 meg hard disc lap-top, which I felt in the present climate was totally over the top. If you don't believe me, see the pictures of the crumbling, rotting schools in the following Sunday's "News of the World": indeed, Roger's Local Authority, Birmingham, had a School's roof collapse earlier in the week. Other lectures, on the other hand, in which the view was expressed that the computer at work should be the computer at home.were, in my opinion, somewhat more down to earth. In spite of this, there is no doubt that we need kite-fliers of this type - He certainly made me think! However I do wish someone in education would understand that it is the quantity of computers in the class that matters - not (necessarily) the quality. Most classrooms would be better off with 10 Spectrum or SAM Coupé systems than a single BBC Master, RML or IBM PC. Some schools are already using Spectrums, others will take the SAM road when MGT start their push into the Primary School market. With the shortage of money in education today what matters is value for money - and you don't get that from an RML.

Then it was off, for a last look round the exhibition again, a short chat to Alan, and the sardine-tin conditions of the Paddington tube. Now that I've an idea of what is there, I'll know what to expect when I go next year....

* + * + *

FILE MASTER FILES

AND HOW TO USE THEM

By: Ray Bray.

The FILE MASTER program is certainly a versatile and friendly filing system as Betterbytes claim, and meets most requirements for storing, ordering, interogating and printing stored data.

However, the usefulness of the system could be greatly extended if the stored data could be collated or manipulated for other applications such as budgeting, invoicing or envelope addressing. This article will give a brief explanation of how the FILE MASTER data is stored and describe a method of loading the data into arrays for use in other programs.

The data is held in OPENTYPE files consisting of a number of ASCII strings and comprising a header block and the file data. The file header, which contains the parameters of the file, is of variable length depending on the number of fields per record. The first 9 strings are standard and hold the following information:-

1. File name.
2. Indicates whether the file is password protected.
3. Number of the next record to be entered.
4. Maximum number of records.
5. Number of fields per record.
6. Record length.
7. Flag to indicate if last field is numeric.
8. Offset to unscramble password.
9. Scrambled password.

Next are the number of strings, equal to the number of fields per record, holding the headings for each field. The file header is concluded by several pairs of strings, one pair per field, giving the start and finish of each field. The total file header if therefore 9+(3*Fields per record) strings long. The data record string follow the header information without any special marker, and an individual record is one continuous string without any markers between the fields or adjoining records.

So much for the file description. The program below allows loading of a single file or a series of continuation files at one time, but it would be logical to amend the file loading routine (lines 20 to 80) to suit the application. The program starts reading the file strings assuming there will be the maximum permissable number of fields in each record. Line 110 computes the number of records in the file from string 3. Line 130 picks up the actual number of fields from string 5, sets the number of strings to read, and computes the string number of the first record. Line 140 picks up the record length from string 6 and DIMs the record and field marker arrays. Lines 160 and 170 place the records and field markers in their respective arrays. Finally, line 220 checks if a series of files is being loaded and, if necessary, goes round the loop again.

Once the data has been transferred to arrays an individual field in any record can be accessed in any of the following ways:-

a. To access record 31, field 5:-

```
LET F$=R$(31)(F(5,1) TO F(5,2))
```

b. Take a printout of the field array and pick out the relevant field markers manually to give the normal entry:-

```
LET F$=R$(31)(85 TO 90)
```

c. Employ a subroutine to return the required field:-

```
1000 LET REC=31: LET FLD=5: GOSUB 5000
5000 LET FB=F(FLD,1): LET FF=F(FLD,2)
```

```
5010 LET F$=R$(REC)(FB TO FF)
5020 RETURN
```

So, if you want a special style of print-out or if you need statistics from your files, you now have no excuse. FILE MASTER is so 'user friendly' and now you can handle the data in any way you want.

```
  1 REM ***PROGRAM TO READ***
  2 REM ***FILE MASTER FILES***
 10 LET RW=1: LET NUM1=1: LET TR=0
 20 INPUT "Enter number of files to be
    loaded. ";NUM
 30 INPUT "Enter filename. If series i
    s to be loaded do not enter file n
    umber. ";Q$
 40 IF NUM=1 THEN LET L$=Q$: GOTO 70
 50 LET N$=STR$ NUM1: IF NUM<10 THEN L
    ET N$=" "+N$
 60 LET L$="          ": LET L$( TO LEN
    Q$)=Q$: LET L$(7 TO )=N$
 70 LET N=69: LET N1=1: LET N2=1: LET
    NF=0: LET NR=0: LET FR=0: LET LN=0
 80 OPEN #6;D1"D_"+L$IN
 90 FOR J=1 TO N: INPUT #6;C$
100 IF J=1 OR J=2 THEN NEXT J
110 IF J=3 THEN LET NR=VAL C$-1: NEXT
    J
120 IF J=4 THEN LET TR=VAL C$: NEXT J
130 IF J=5 THEN LET NF=VAL C$: LET N=N
    F*3+NR+9: LET FR=NF*3+10: NEXT J
140 IF J=6 THEN LET LN=VAL C$: IF NUM1
    =1 THEN DIM R$(TR*NUM,LN): DIM F(N
    F,2): NEXT J
150 IF J>6 AND J<17 THEN NEXT J
160 IF J>FR THEN LET R$(RW)=C$: LET RW
    =RW+1: GOTO 195
170 IF NUM1=1 THEN LET F(N1,N2)=VAL C$
180 IF N2=1 THEN LET N2=2:NEXT J
190 LET N1=N1+1: LET N2=1
195 IF J=N THEN GOTO 210
200 NEXT J
210 CLOSE #*6
220 IF NUM1<NUM THEN LET NUM1=NUM1+1:
    GOTO 50
```

LIST OF VARIABLES

```
N = input string limit
N1 & N2 = field array counters
NF = field number
NR = number of records in file
FR = string number of first record
TR = maximum records in file
RW = row number record array
NUM1 = file counter
LN = length of one record
```


NEV'S HELP PAGE

By: Nev Toung.

Juan Serra of Barcelona has discovered a bug in the DISCiPLE ROM. That is when you have no disc in the drive then the system may hang with the keyboard locked out until you put a disc in. This is because there is no hardware signal from the drive to test if a disc is present. So to do this test MGT start the disc and then wait for two index pulses. If they don't come then there is no disc. Unfortunately this is not done on all commands. That is why everything hangs up. There is no way out, other than to reset or put a disc in.

The commands that cause this problem are LOAD @ and SAVE @. You can test for a disc yourself from basic by using the command OPEN #15;d1"*"IN: CLOSE #*15. Providing you have at least one file on the disc this should work OK. It will also give the 'NO DISC in drive' report.

Juan is also confused over the memory maps of the DISCiPLE and the PLUS D. These are mapped as follows:-

PLUS D 0-8191 ROM, 8192-16383 RAM
DISCiPLE 0-8191 RAM, 8192-16383 ROM.

Juan has been hacking into the system setup programs and has noticed that the "mover" program loads the DISCiPLE code into 8192-16383. How can this be after all it is ROM? The answer lies in the fact that the DISCiPLE can do much more than the PLUS D. The DISCiPLE can change the ROM and RAM around to be the same as the PLUS D, that is with ROM at address 0. This is controlled by a port at address 123. The command IN a,(123) will put ROM at address 0 and OUT (123),a will put RAM at address 0.

Why you may ask. The DISCiPLE can in fact have a 16K ROM and you would swap the ROM and RAM over to gain access to the other half. In fact the DISCiPLE only has an 8K ROM so the same code appears at both addresses. When you first switch on the DISCiPLE ROM is at address 0. It must be to handle the restarts and interrupts. But when you load the system file ROM and RAM are swapped over. The "mover" program has to work with ROM at address 0 otherwise the machine would crash as soon as the shadow memory is paged in.

Now for two quick replies. D.W.Stokes of Cornwall to get the Sector-Map program (issue 2/6) to print the program numbers correctly change line 150 to read:-

```
PRINT #C;''INVERSE 1;"P";P+1;TAB 5;"""
";N$;""":-"
```

Paul Godfrey of Clwyd. Would like to know how to go about converting multi load games to run from disc. So would I. So I've sent your letter to Hugh (Hack Zone) McLenaghan. He says he has already converted some 30 or so multi loaders so if this is of interest he would be only too glad to hear from you.

A.Blythe of Yorkshire is non plussed. He has seen an article on converting VU3D that refers to the keyword 'PLAY', But he doesn't have that keyword on his spectrum. The answer is that when the nice boys at Amstrad put that nice sound chip thing on the +2 they also introduced a new keyword 'PLAY' to drive it from basic. The problem was there was nowhere to put a new keyword as all the codes are used. So they stole the last two user defined graphics. 'T' became 'PLAY' and 'U' became 'SPECTRUM'. This means that if you use any program that uses these UDGs in 128K mode, instead of the graphic you get the new keywords.

Chris Brown of Essex would like to

know if there is a poke that will turn off graphics mode in the same way as you can turn off caps. Yes there is. POKE 23617 with values of 2 for graphics, 1 for extended mode and 0 for the 'L' cursor. Values other than 0, 1 or 2 are unpredictable.

Chris would also like to know if data arrays can be safeguarded when loading new data or programs. Yes just use merge. Oh he has and gets an out of memory report. OK then try this:

```
9990 DATA 33,0,0,205,110,25,229,33,15,
     39,205,110,25,209,195,229,25
9991 RESTORE 9990: FOR N=16384 TO 1640
     0: READ D: POKE N,D: NEXT N
9999 RANDOMIZE USR 16384: MERGE "prog-
     name": GOTO 0
```

This will delete lines 1 to 9998 of the current program and so allow you to merge a new one.

Leslie Pollard of Potters Bar is having real problems with a DISCiPLE and TWO disc drives. It would seem that drive two keeps disappering and a POKE @2,208 is needed to get it back.

It sounds like you have a problem with understanding when pokes take effect and how long they last.

When you do POKE @2,208 part of the DISCiPLE's memory is changed. It will keep that new value until you change it again, or switch the machine off. As most of these POKEd values are needed by the DISCiPLE they are saved to disc along with the system file when you do SAVE "Sys 3d" CODE 0,6656. This means that when you boot the system or reload the system file ALL the pokes take on the values they had the last time you saved the system file to that disc. This can be useful if you use your machine for different things. For example I have a disc just for networking, another for wordprocessing, and a few others. But it also means that if you change the system file on one disc then any other will not have been changed. An example was when I upgraded to Sys 3d I had to copy that file to over 60 discs. So what I think you may have done is changed some of your discs but not others - so some of your system files are still set up for only one drive.

Next, if you want a left margin on your snapshot screen dumps then if, AND ONLY IF, you have an Epson compatible printer you can set a margin by:-

```
LPRINT CHR$27;CHR$108;CHR$ MARGIN
```

Where MARGIN is a number between 0 and 255. Remember to do POKE @6,1 before to allow control codes to be sent and POKE @6,0 after to reset normal working.

Setting a margin this way will stay in effect until changed or the printer is switched off.

Thats all for this month. Remember If you don't write to me I can't write this page. I also have to point out that I can not answer questions personally so DO NOT send me return postage etc. I will attempt to answer as many queries as possible but only through the magazine.

Write to FORMAT or directly to me at:-

FORMAT Help Line,
3, Mitchell Place,
Falkirk,
Stirlingshire,
Scotland,
FK1 5PJ.

"This where I keep my rock collection."

By: Paul Rigby.

The Hobbit. This was the first "fantasy" book I ever read. Prompted, mainly, by the advent of the adventure. I have never regretted the decision, either, or the subsequent reading of the Lord of the Rings. Excellent books (wish I could say the same about the abysmal adventures) which opened up a whole new literary field.

I always chuckle, when I look back at the reviews of The Hobbit to see the lack of playtesting the reviewers gave it, or was it fawning to the big publisher? Then again, maybe it was a complete ignorance on the glossies' part. How often have you read a game review with a furrowed brow knowing that the reviewer hasn't even touched the game - never mind assessed its pros and cons. Such was the treatment of The Hobbit. With the awful re-release of the Three Stooges (aka The Hobbit, Lord of the Rings and Shadows of Mordor) we now see review quotes placed upon the advertisements which must have been dragged up from dusty back-storerooms, carefully stored micro-fiche or from under someone's bed. Where else do the wondrous platitudes come from? The advertisement is splattered with complimentary comments about the sheer quality of the threesome. The Hobbit? My God what a game! Sheer poetry magnetically sealed upon tape, glorious literary art sculptured to a fine form and...pass the sick-bag someone. I can only imagine that, in an office full of pin-stripe, someone dropped the three-pack upon some unfortunate's desk and said, "If you can sell that lot you stand a good chance of a pay- rise and a month in the Bahamas."

Just for a laugh, I took another look at The Hobbit, starting my stop-watch to see how long it would take me to find a bug - 13.45 seconds. Walking along the Hidden Path, spying trolls footprints (brings it all back doesn't it?), I typed, "Exam Prints" - Upon which the whole game locked up. Ah, they don't make 'em like that any more.

It's strange isn't it? Look at the release of Melbourne House's three major releases (The Hobbit, Lord of the Rings and Sherlock), read the glowing "glossie" reports on all three, realise what complete and utter rubbish they actually are and then see the self-same journos saying that they knew they were rotten all along!

But really, folks. The Hobbit legacy doesn't end there. It runs free through the minds of narrow imaginations. Okay, the first time The Boggit appeared everyone had a laugh and a joke. The Bored of the Rings? Well, not quite so funny but old Pergus had to issue a sequel didn't he? Follows the real thing doesn't it? Then the homegrown mob join in. The first couple of examples could be tolerated with a modicum of good-natured patience. However, events are going too far. It was when I received a copy of The Hobble Hunter from the, normally, quality outfit known as Compass Software that I felt enough was enough. The Hobble Hunter, you needn't ask, is a Hobbit rip-off/plot- twist/derivative, etc. This is the umpteenth Bulbo, Bungo, Boggit, Dildo game and I've had JUST ABOUT ENOUGH!!!!! What almost made me cry was when Compass admitted that this was their first attempt at a

humorous adventure. So why pick the blasted Hobbit!! Why does "funny" translate as "Hobbit"? What happened to imagination? I've heard about flogging a dead horse but come on chaps, when you find that all you're left holding is a few strands of horse hair you just have to call it a day! So let's cool it with the Hobbits okay?

Incidently, he says brushing his hair back, straightening his tie and taking a stiff drink, I am certainly looking forward to the arrival of MGT's SAM Coupe (Hobbits again?!? - aaaarrrrggh!). No, really. What I would like to know is - are Gilsoft planning a SAM version of the PAW? I doubt that any unsurmountable problems would occur. Think of it. They already have a Speccie version out, of course. They also have a PLUS D/DISCiPLE version out. Who produces the PLUS D/DISCiPLE? Why, good'ol MGT of course. With the SAM being able to use PLUS D/DISCiPLE discs I can definitely envisage a SAM PAW in the offing. All that would be needed would be to allow for the superior sound and graphics. A matter of building upon what is already available.

Hang on a tic. What's this? Why it's...it's a letter! Another one? My goodness, that makes...eh, no lets get this right - oooohh, it must be...two! Yes, that's right two. The kind-hearted soul is (extended drum roll) Robert Cheetham! Thanks Robert. Maybe I'll create a Roll of Honour, or something.

I've said it before and I'll say it again (well, it's my column isn't it?) - FORMAT readers are full of good ideas and intelligent opinions. When was the last time anyone ever said that about a Crash reader, eh?

Many thanks for the kind words regarding the Adventure Corner, Robert (blush). He concurs with my comments about Scott Adams (good man) and has strong views regarding graphics in adventures, "I have yet to see an adventure where the graphics add to the game, other than wasting valuable space which could be used for one more problem, extra locations, etc."

Robert then cites Lancelot as a game, played on his Spectrum +3, which was let down by appalling pictures, "The best adventures I have played have been home-grown, written with implements such as the PAW, Quill or GAC...the mail order games are the elite, and often exceed professional adventures in quality and enjoyment."

Fair enough, I've played a few commercial adventures myself which, beneath the gloss, are as empty as Crash (yes, it's "Knock Crash" month in your super soaraway FORMAT). Homegrown adventures hold no pretences or delusions of grandeur, just honest to goodness fun. Robert asks, "Will FORMAT review mail-order adventures? I think that more games could be sold via FORMAT than through the national press, for the reason that FORMAT reaches a more mature section of the public, rather than those who couldn't write a simple Basic program to save their lives and who use their computers solely for playing games upon. These are the kind of people that really get my back up by refusing to play adventures because "they're boring"".

It's interesting, Robert, that you don't consider adventures to be considered as a "game". I know what you mean, though. Robert's only complaint about FORMAT is, "...that the adventure column is too short. Can't you ask the Editor for more space? It seems a shame that such a fantastic column is only two or three pages long."

Well Robert, or can I call you Bob? You took the words right out of my printer-head. What do you reckon Ed? Told you the FORMAT readers were an intelligent lot, didn't I? Ed? Are you there Ed? Helloooo...

- - - - - - - - -

What do you, the readers, think? Should the Adventure Corner include some reviews of new/old releases? Write in and let us know. We like to provide what our readers want.

THE SECRETS OF WORD MANAGER

SPECTRUM MACHINE CODE MADE EASY

Part 10. By: Francis Miles.

SYSTEM VARIABLES AND FLAGS - Part 2.

Preset and Zero Variables:- An extremely convenient place to store program variables is the ZX print buffer, 256 bytes starting at 23296; these bytes will never be disturbed unless your program uses the ZX Printer ("Word Manager" doesn't cater for ZX printers), and they will always be zero when the program is loaded. And using these locations costs nothing in memory; if your program doesn't use them, nothing else will.

However, these 256 bytes are not part of your machine code and will not be saved with your machine code (unless you include a routine to save and reload them as a separate block); you must expect them always to be zero when your program is loaded.

Early versions of "Word Manager" put practically all the program variables in the print buffer, and saved very little with the program. But it soon dawned on me that users would like to save quite a lot of settings with the program: things like the "display control" settings - the screen colours, FIGS LOCK, the tab setting, etc - and the print format, page length, double spacing, etc. So the latest version spares a bit of its own memory for these settings - many of them are one-bit flags and take up very little space anyway.

Two variables are actually saved with each data file(text file) created by "Word Manager": the print line length (the lo byte copied from LINEP) and the text length (LO).

Long-range and short-range (transient) variables:- This is not a hard and fast distinction, but certainly some of the program variables (eg MSSP) are given one value which they keep through the whole running of the program, others are changed only rarely and referred to often, while some are used only for the space of a single subroutine or a little longer.

The "Word Manager" subroutine NP is used by both the "insert" and "delete" routines to control paragraphing:-

```
0330 NP      EQU $
0340 ;put DO=text position of last
0350 ;character in paragraph or
0360 ;last in text. put DCO=number
0370 ;of trailing blanks in last line
0380 ;of paragraph. return with NC if
0390 ;last paragraph
0400 ;find next new para start
0410         LD HL,(C1)
0420 NP.LP   CALL HATCH
0430         PUSH AF : FLAG
0440         CALL PLUSL
0450         POP AF : -
0460         JR NZ,NP.LP
```

[C1 holds the cursor address, and PLUSL as seen above moves HL on by one line. HATCH returns with zero if the next line has a new paragraph marker. Thus this loop puts HL somewhere on the first line of the next paragraph.]

```
0470 ;find pe, text address of last
0480 ;line end of current paragraph
0490         CALL ENDS
0500         PUSH HL ; pe
```

[ENDS was explained in the article on Arithmetic, it moves HL to the end of the preceding line.]

```
0510 ;count back to last character
0520 ;of paragraph.
0530         CALL HLM
```

[pe is a text address, ie counted from text zero. HLM converts it to a memory address so its character can be read.]

```
0540         LD A,32
```

```
0550        LD DE,-1
```

[DE is made a counter for "space" characters, code 32.]

```
0560 NP.LP2 CPD
0570        INC DE
0580        JR Z,NP.LP2
0590 ;No. of trailing blanks in DCO
0600        LD (DCO),DE
0610 ;text address of last non-space
0620 ;in DO
0630        INC HL
0640        CALL HLT
0650        LD (DO),HL
0660 ;return with carry if pe<LO
0670        POP HL ; -
0680        LD DE,(LO)
0690        SBC HL,DE ;pe-LO
```

[HLT cannot produce carry, and nothing has been done since the call to HLT which could produce carry; so the usual "AND A" is not required here.]

```
0700        RET
```

Both DO and DCO are very short-term variables, changed every time anything is inserted or deleted - which includes every time the paragraph is justified or unjustified, or a transposition is made.

A certain amount of calculation, or judgement, is often required in planning such programming: is it more economical or faster to keep some value on the stack, or to park it in a variable and retrieve it later?

PUSH HL and POP HL together are two bytes and take 21 ticks of the program clock; LD (ADDR),HL and LD HL,(ADDR) together are six bytes, plus two for the variable, and take 36 ticks. But it is not always as simple as that! Where several values are involved, and also complications of jumps and RETS, stack management can rapidly get out of hand and use up more bytes and more time than the use of a transient program variable. And in simple programs it often doesn't matter very much about either speed or economy of memory; in these programs using program variables often simplifies things a great deal.

A further resource is to use multi-purpose program variables, given short-term values which mean one thing in one part of the program and something else in another. "Word Manager" has one of these, called S3 for no particular reason; and DCO is also used for a quite different purpose in the Microdrive save/load procedures. This can be tricky, because it is all too easy to overlook the possibility that in some circumstances you may be asking the variable to hold two different values at the same time. Flag variables and numeric variables

Flags are one-bit variables, recording that something or other is "on" or "off"; obviously, you can keep eight flags in a single one-byte variable, so they are economical of memory, and they are easily read and written by the BIT, SET and RES instructions (the hi and lo bits of a flag variable can sometimes be handily read or written by the various rotate instructions, and this possibility should also be kept in mind).

Occasionally flags may be a little more complex, the "Word Manager" program variable FLGS holds these:-

bits 7 & 6: page number at top or bottom of page, or none
bit 5: not used (in latest version)
bit 4: fast or slow print
bit 3: start print from start or at cursor position
bit 2: single or double line spacing
bit 1: continuous print or stop for sheet change
bit 0: not used

The "page number position" flags are handled like this when the program is preparing to print out: the "print option" display is on screen, and one of the options displayed is either:-

"8. Page numbers at top",
"8. Page numbers at bottom", or
"8. No page numbers".

The user has hit key 8, indicating he wants to move on to the next option.


```
3430 ;page number position, set
3440 ;routines for last character,
3450 ;page end, and starter, and
3460 ;tab for page number
3470 ;00------ top of page
3480 ;01------ bottom of page
3490 ;11------ no page numbers
```

[Flags 7 and 6 can be read either as jointly holding the value 0, 1 or 3, with the meanings shown here; or separately, flag 7 set then meaning "no page numbers at all" and flag 6 set meaning "no page numbers at top".]

```
3500 PNOP   LD B,A;save flags
```

[A, and now also B, holds the present value of FLGS.]

```
3510        CP 11000000B
```

[This will give carry if either of the flags is zero.]

```
3520 ;if option 11, then 00, else
3530 ;increase to next
3540        JR NC,PN.TOP
3550        BIT 6,A
3560        JR Z,PN.BOT
```

[Branching three ways: to PN.TOP or PN.BOT, or straight on if no page numbers are wanted.]

```
3570 ;01------ change to
3580 ;11------ no page numbers
3590        SET 7,B
```

[The next few lines load the addresses of "loop lines", preset strings to be sent to the printer controlling its form feeds, etc; PEND is read when the printer gets to the end of a page, P.ST at the beginning of each copy, LAST at the end of each copy.]

```
3600        LD HL,P.NON
3610        LD (PEND),HL
3620        LD HL,S.NON
3630 PN.LO  LD (P.ST),HL
3640        LD HL,L.NON
3650 PN.L   LD (LAST),HL
3660        LD A,B ;recover flags
3670        LD (FLGS),A
3680        JR MF.MN
```

[MF.MN is the address at which the print options are displayed on screen, since the page number position flags have been changed, the display will now show the newly selected option.]

```
3690 ;11------ change to
3700 ;00------ top of page
3710 PN.TOP AND 00111111B
3720        LD B,A
3730        LD HL,P.TOP
3740        LD (PEND),HL
```

[If page numbers are to be printed at the top of the page, they are printed in the top right-hand corner; so a value 6 spaces in from the right margin is now put in TBN, the page number TAB constant.]

```
3750        LD A,(LINEP)
3760        SUB 6
3770        LD (TBN),A
```

[Some of the "loop line" selections are the same for "top of the page" and "no page numbers".]

```
3780        LD HL,S.TOP
3790        JR PN.LO
3800 ;00------ change to
3810 ;01------ bottom of page
3820 PN.BOT SET 6,B
3830        LD HL,P.BOT
3840        LD (PEND),HL
3850        LD HL,S.BOT
3860        LD (P.ST),HL
```

[Page numbers at the bottom of the page are centred, so TBN is set at half the print line less one.]

```
3870        LD A,(LINEP)
3880        SRL A
3890        DEC A
3900        LD (TBN),A
3910        LD HL,L.BOT
```

[Again some of the "loop line" settings are the same as for no page numbers.]

```
3920        JR PN.L
```

These "double flags" are a little like the PAPER and INK numbers incorporated with flags in the attributes code described at the start of last month's notes.